

## CLAIMS

- [C001] 1. A method for estimating a remaining equipment life based on a plurality of parameters comprising:
- collecting data relating to the plurality of parameters;
  - storing the data;
  - integrating the stored data; and
  - estimating the remaining equipment life using the integrated data.
- [C002] 2. The method of claim 1, wherein the plurality of parameters comprise at least two of usage data, fault code data and age data.
- [C003] 3. The method of claim 1, wherein the plurality of parameters are selected from the group consisting of usage data, fault code data, age data, failure modes for sub-components, test results, failure modes and effect analysis, maintenance practice, heuristics, and replacement parts information.
- [C004] 4. The method of claim 1, further comprising, prior to integrating, modeling a plurality of relationships relevant to the plurality of parameters to generate a plurality of modeled relationships, wherein integrating the stored data comprises integrating the plurality of modeled relationships.
- [C005] 5. The method of claim 1, wherein the integrating comprises determining a representation for at least one of the plurality of parameters in terms of a unified index indicative of the remaining equipment life.
- [C006] 6. The method of claim 5, wherein the integrating further comprises mapping the at least one of the plurality of parameters to the unified index, to generate at least one mapped parameter.
- [C007] 7. The method of claim 6, wherein the mapping further comprises fusing the at least one mapped parameter with at least one other mapped parameter to estimate the remaining equipment life.

**[C008]**        8.        The method of claim 6, wherein the mapping further comprises fusing the at least one mapped parameter with at least one other unmapped parameter to estimate the remaining equipment life.

**[C009]**        9.        The method of claim 7, wherein the fusing comprises using an aggregation technique to estimate the remaining equipment life.

**[C010]**        10.       The method of claim 6 further comprising generating a life estimate curve for the equipment based on the unified index, wherein the curve is a model from which the remaining equipment life can be derived.

**[C011]**        11.       A method for estimating a remaining equipment life based on age, fault code, and usage pattern parameters comprising:

collecting age data, fault code data, and usage pattern data relating to the parameters;

mapping the fault code data to a fault code to age adjustment index;

mapping the usage pattern data to a usage to age adjustment index;

estimating an age adjustment state from the fault code to age adjustment index and the usage to age adjustment index; and

fusing the age data and the age adjustment state into a unified age adjustment value indicative of the remaining equipment life.

**[C012]**        12.       The method of claim 11, further comprising, prior to mapping, modeling a plurality of relationships relevant to the age, fault code and usage pattern parameters to facilitate the mapping.

**[C013]**        13.       The method of claim 11, wherein mapping fault code data comprises representing the fault code to age adjustment index based on the number of error messages generated by the equipment.

**[C014]**        14.       The method of claim 11, wherein the mapping usage pattern data comprises representing the usage to age adjustment index as a ratio of a weighted

average of the time spent at a plurality of load settings relevant to the equipment to the power value consumed by the equipment.

**[C015]** 15. The method of claim 14, wherein the plurality of load settings are indicative of a type and duration of a plurality of load conditions subjected to by the equipment.

**[C016]** 16. The method of claim 11, wherein the estimating comprises calculating the fault code to age adjustment index and the usage to age adjustment index.

**[C017]** 17. The method of claim 11, wherein the fusing comprises computing a weighted sum of the age data and the age adjustment state to estimate the remaining equipment life.

**[C018]** 18. The method of claim 11, wherein the fusing comprises using a linear aggregation technique to estimate the remaining equipment life.

**[C019]** 19. The method of claim 11 further comprising generating a life estimation curve for the equipment based on the unified age adjustment value, wherein the curve is a model from which remaining equipment life can be derived.

**[C020]** 20. A system for estimating a remaining equipment life based on a plurality of parameters comprising:

a data storage component configured to store data relating to the plurality of parameters;

a data integration component configured to integrate the stored data;  
and

a life estimation component configured to estimate the remaining equipment life using the integrated data.

**[C021]** 21. The system of claim 20, wherein the plurality of parameters comprise at least two of usage data, fault code information and age.

**[C022]** 22. The system of claim 20, wherein the plurality of parameters are selected from the group consisting of usage data, fault code data, age data, failure modes for sub-components, test results, failure modes and effect analysis, maintenance practice, heuristics, and replacement parts information.

**[C023]** 23. The system of claim 20, wherein the data integration component comprises a data modeling subcomponent configured to model a plurality of relationships relevant to the plurality of parameters to generate a plurality of modeled relationships, wherein integrating the stored data comprises integrating the plurality of modeled relationships.

**[C024]** 24. The system of claim 20, wherein the data integration component further comprises a data mapping subcomponent configured to determine a representation for at least one of the plurality of parameters in terms of a unified index indicative of the remaining equipment life.

**[C025]** 25. The system of claim 24, wherein the data mapping subcomponent is further configured to map the at least one of the plurality of parameters to the unified index, to generate at least one mapped parameter.

**[C026]** 26. The system of claim 25 wherein the data mapping subcomponent is further configured to fuse the at least one mapped parameter with at least one other mapped parameter to estimate the remaining equipment life.

**[C027]** 27. The system of claim 25, wherein the data mapping subcomponent is further configured to fuse the at least one mapped parameter with at least one other unmapped parameter to estimate the remaining equipment life.

**[C028]** 28. The system of claim 24, wherein the system is further configured to use a linear aggregation technique to estimate the remaining equipment life.

**[C029]** 29. The system of claim 24 is further configured to generate a life estimation curve for the equipment based on the unified index, wherein the curve is a model from which the remaining equipment life can be derived.

**[C030]** 30. A computer-readable medium storing computer instructions for instructing a computer system to estimate a remaining equipment life based on a plurality of parameters, the computer instructions comprising:

- collecting data relating to the plurality of parameters;
- storing the data;
- integrating the stored data; and
- estimating the remaining equipment life using the integrated data.

**[C031]** 31. The computer-readable medium of claim 30, wherein the plurality of parameters comprise at least two of usage data, fault code information and age.

**[C032]** 32. The computer-readable medium of claim 30, wherein the integrating comprises instructions for determining a representation for at least one of the plurality of parameters in terms of a unified index indicative of the remaining equipment life.

**[C033]** 33. The computer-readable medium of claim 32, wherein the integrating further comprises instructions for mapping the at least one of the plurality of parameters to the unified index, to generate at least one mapped parameter.

**[C034]** 34. The computer-readable medium of claim 33, wherein the mapping further comprises instructions for fusing the at least one mapped parameter

with at least one other mapped parameter or unmapped parameter to estimate the remaining equipment life.

**[C035]**        35.     The computer-readable medium of claim 32 further comprising instructions for generating a life estimation curve for the equipment based on the unified age adjustment value, wherein the curve is a model from which the remaining equipment life can be derived.